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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,842	07/28/2003	Bhabendra Pradhan	A03092US (15630.141)	5824
22920	7590	01/10/2006	EXAMINER	
GARVEY SMITH NEHRBASS & NORTH, LLC LAKEWAY 3, SUITE 3290 3838 NORTH CAUSEWAY BLVD. METAIRIE, LA 70002			LISH, PETER J	
		ART UNIT	PAPER NUMBER	1754

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/628,842	PRADHAN, BHABENDRA
	<b>Examiner</b>	<b>Art Unit</b>
	Peter J. Lish	1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 20 October 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 11-19 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-10 and 20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_ .
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-10 and 20 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4-6, and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Smalley et al. (US 6,761,870).

The date of the corresponding PCT international publication with a date of May 11<sup>th</sup>, 2000, is relied upon as the basis for the rejection under 102(b).

Smalley et al. teaches a method for the selective growth of single-walled carbon nanotubes (SWNTs). The purity of the SWNT product is greater than 99% (col. 4, lines 60-67) and the selectivity of SWNTs in the product is greater than 99% (col. 13, lines 5-17). The yield of the process is not specifically taught, however, it is expected that it meet the claimed range because of the high purity and selectivity of the product as well as the extremely small size of the

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catalyst. Where, as here, the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention, the burden of proof is shifted to the applicant, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

The nanotubes are grown using unsupported catalysts, which are formed during the nanotube growth process. It is inherent that the catalysts have particle sizes of less than 10 nm because the process of Smalley et al. produces nanotubes with diameters between 0.6 and 0.8 nm. It is noted that the diameter of the nanotubes produced by chemical vapor deposition corresponds to the diameter of the catalyst particles from which they are grown. The surface area of the catalyst particles is not specifically taught, however, it is expected that it be within the claimed range of greater than  $50 \text{ m}^2/\text{g}$  because of the extremely small particle sizes.

Additionally, it is expected that the catalyst be in the form of a single crystal because of the extremely small particle sizes. Where, as here, the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention, the burden of proof is shifted to the applicant, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

Claims 1-2, 4-10, and 20 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Huang et al. (US 2004/0005269 A1).

Huang et al. teaches a method for the production of either multiwalled carbon nanotubes or single walled carbon nanotubes by the chemical vapor deposition of a carbon feedstock over a

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specified catalyst. The catalyst comprises a mixture of a transition metal, such as iron, cobalt, or nickel, with a lanthanide element. The lanthanide element does not act as a support, but rather allow for the use of lower temperatures and correspondingly higher purity nanotube growth (paragraphs 35-37). The catalysts may be a mixture of the metal oxides and is preferably less than 10 nm in particle size. The growth temperature may be 400 – 800 °C (paragraph 42). The growth process produces multi-walled nanotubes having greater than 99% purity (paragraphs 72-73) and very high (> 95%) selectivity.

Though it is taught (example 1) that the productivity of the catalyst is in the range of 5,000 to 10,000 %, the yield of the process is not specifically taught. However, it is expected that it meet the claimed range because of the productivity of the catalyst. Where, as here, the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention, the burden of proof is shifted to the applicant, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

The surface area of the catalyst particles is not specifically taught, however, it is expected that it be within the claimed range of greater than 50 m<sup>2</sup>/g because of the small particle sizes, which fall within the applicant's claimed range. Additionally, it is expected that the catalyst be in the form of a single crystal because of the small particle sizes. Where, as here, the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention, the burden of proof is shifted to the applicant, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. as applied above and further in view of Rudy et al. (US 4,881,994).

Huang et al. do not specifically teach the production of the catalyst by a flame synthesis method. Rudy et al., however, teach a method for the production of iron oxide catalysts having small particle sizes using a flame synthesis. It would have been obvious to one of ordinary skill at the time of invention to make the catalyst of Huang et al. using a flame synthesis, as the production of catalysts by flame synthesis is known in the art.

### ***Conclusion***

The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 6,221,330; US 6,849,245; US 5,618,875; and US 2003/0004058.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J. Lish whose telephone number is 571-272-1354. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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